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used later in responses. All this is quite apart from the question of the energy fixed in photosynthesis.

This suggests another fault. BOSE seems to ignore, if he is not ignorant of, the anatomy of the parts with which he is dealing. Skin is skin, whether it be the skin of plant or animal. Stomach of Gecko and pitcher of Nepenthes (an open stomach of a primitive type, he calls it) are all one to him; they behave alike, in spite of their extraordinary differences of structure. Nerves of animal and nerves of plants, which have been identified by their behavior as the vascular bundles of plants, are physiologically the same. Digestion being a "diphasic process," that is, consisting of secretion first and absorption afterward, roots, which secrete substances that dissolve their mineral "food" and then absorb it, must be another kind of open stomach; and besides, they behave electrically as stomachs do! Now if these things are so, it argues that the responses with which BOSE is dealing are either extremely superficial or extremely fundamental, inhering in all living matter; and in either case they would be of little significance.

The situation seems to be most peculiar. BOSE, we judge, is a brilliant experimentalist, trained first as a physicist, but inadequately equipped with knowledge of what has been done in the field of plant irritability. This has been at once an advantage and a snare. It has left him free to present his researches untrammeled by the conventional view, but it has exposed him to mistakes which a little more knowledge would have avoided. It has given him courage to attack the most knotty problems, but it has led him to satisfaction with inadequate conclusions. Apparently, too, he has become possessed by a theory as to the nature of response, and under the yoke of that theory he makes all his captive facts to pass.

Out of these books we look for some one to rescue many good observations, now apparently gone awry; and by his methods and apparatus in the hands of real physiologists we hope soon to see made important advances in the knowledge of *Reizphysiologie.*—C. R. B.

Conference on Genetics

The report[4] of the Third International Conference on Genetics held under the auspices of the Royal Horticultural Society, July 30 to August 3, 1906, is a veritable treasure-trove for students of heredity, hybridization, and plant-breeding, both in their theoretical and practical aspects. Besides giving a minute account of the doings of the Conference, there is a brief but excellent sketch by the secretary, Rev. W. WILKS, of the life and work of GREGOR MENDEL, illustrated by three good portraits, a fine view of the Abbey at Brünn, and a facsimile letter written to NÄGELI. Excellent portraits are also given of some of the more prominent participants in the Conference, as LAWRENCE, WILKS, BATESON, JOHANNSEN, TSCHERMAK, WITTMACK, HURST, Miss SAUNDERS, and the VILMORIN brothers.

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[4] Report of the Third International Conference, 1906, on Genetics; hybridization (the cross-breeding of genera or species), the cross-breeding of varieties, and general plant-breeding. Edited by the Rev. W. WILKS. 8vo. pp. 496. *figs. 131.* London. 1907.

Besides the address of the chairman, Prof. BATESON, upon "The progress of genetic research," there are a number of important contributions to Mendelian inheritance, by HURST, DARBISHIRE, DAVENPORT, Miss SAUNDERS, TSCHERMAK, and BIFFEN; two papers upon orchid hybrids by ROLFE, and CRAWSHAY; and several papers upon the occurrence of natural hybrids, the most comprehensive of which by E. G. CAMUS is not printed in full because it was sufficiently voluminous to make a separate book. This paper deals with the spontaneous hybrids of the European flora. A lengthy list of natural hybrids is also given by LYNCH, Curator of the Botanic Garden, Cambridge. PFITZER deals briefly with hybridization and the systematic arrangement of orchids, and a valuable posthumous paper by the same author discusses the probability of the origin of the Orchidaceae from the Amaryllidaceae. OSTENFELD describes some castration experiments with Hieracium, and ROSENBERG reports briefly his work upon the cytology of Drosera, and also on Hieracium hybrids. In some of the latter he has found considerable differences in the number of chromosomes carried by different eggs of the same plant. BUNYARD reviews the question of xenia, stating that after an extensive search for evidence of this phenomenon he knows of but a single instance, this being an apple cross made by him ("Sandringham" × "Bismarck"). J. H. WILSON describes a considerable number of infertile hybrids, which he has studied with some care.

Dealing with plant breeding from the more practical point of view are the following: E. F. SMITH outlines the plant-breeding operations of the U. S. Department of Agriculture; the improvement of sugar cane is discussed at length by Sir DANIEL MORRIS; papers by ZAVITZ, P. DE VILMORIN, C. E. SAUNDERS, and BIFFEN describe results in breeding improved races of wheat and other small grains; HANSEN tells of his work in breeding cold-resistant fruits; RIVERS and LAXTON also give some of their results in hybridizing fruits, particularly peach × nectarines, apple hybrids, and plum hybrids; LAXTON draws some conclusions from the work with peas for which his family is justly famous; WARD gives a finely illustrated description of some of his excellent work on carnations, explaining among other things his method of keeping pedigree records; VAN TUBERGEN, of Haarlem, discusses hybrids among bulbous plants; PAUL gives the derivation of a number of fine hybrid roses of recent production; H. H. GROFF, the specialist in Gladiolus, discusses plant-breeding from the point of view gained by work with these plants, and emphasizes the idea that the plant-breeder has much to learn from the animal-breeder. There are several shorter papers by other authors.

Many of the articles are illustrated with fine halftones and the press work is up to the high standard for which the reports of the Royal Horticultural Society are well known.—GEORGE H. SHULL.